Unit 1

Supply Chain, Logistics and Warehousing

Supply chain consists of the steps taken by any business to serve its customers. The present business environment has changed drastically with managers giving more emphasis to supply chain. Efficient supply chain improves the availability of the products *viz-a-viz* the company's profit. Companies must seek new ways to improve supply chain, like weight and route planning and network design. Supply chain helps to stock different categories. If managed in an effective and efficient manner supply chain will help companies in earning profits.

Logistics operations have their own significance. It is important for the product to be made available easily and widely in the markets because faster product availability is the basis of growing sales. For example, two products with the same specification are launched at the same time by two different companies. After one or two months, there is shortage of one product in the market. In that case, there will be a substantial profit advantage for the other product during that extra time. This results in the customers slowly shifting their preferences to the other company's product and that company will get more orders and more market share. Thus, availability of the products can break a sale which ultimately depends on the supply chain.

SESSION 1: INTRODUCTION TO SUPPLY CHAIN

Logistics is the process of planning, implementing and controlling procedures for the efficient and effective transportation and storage of goods.

Concept of supply chain

The success of the business often depends on the success of the supply chain. Supply chain management deals with—

(a) Material flow
(b) Information flow
(c) Financial flow

Material flow

This physical flow of products from the supplier/seller/buyer to the customer is one directional or unidirectional. (Fig. 1.1)

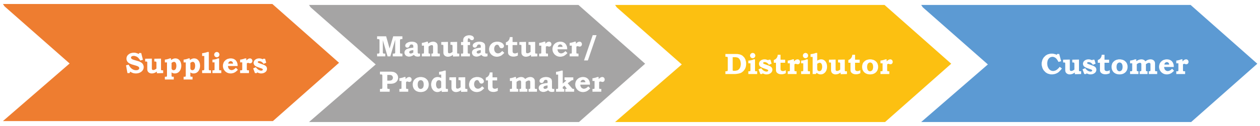


Fig. 1.1: Material Flow in Supply Chain

Information flow

Here the information flows from the supplier/seller to the customer/buyer, and then from the customer to the supplier as shown in Fig. 1.2.

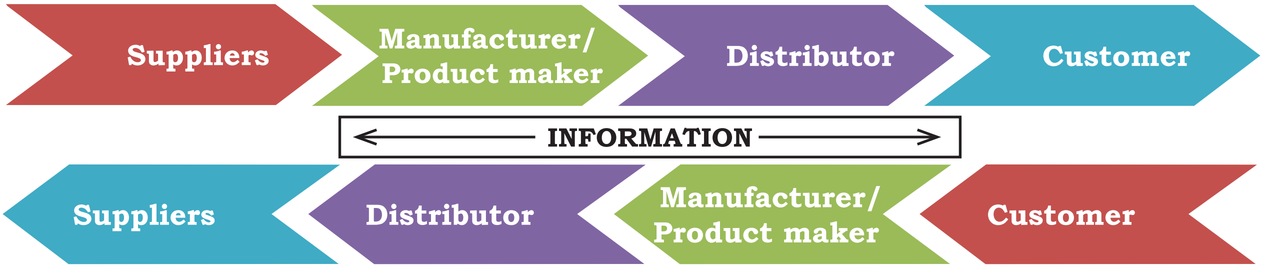


Fig. 1.2: Information Flow in Supply Chain

Financial flow

Here, the money flows from the customer to the supplier, wherein the customer accepts the product and confirms that the payment goes to the suppliers as shown in Fig. 1.3.

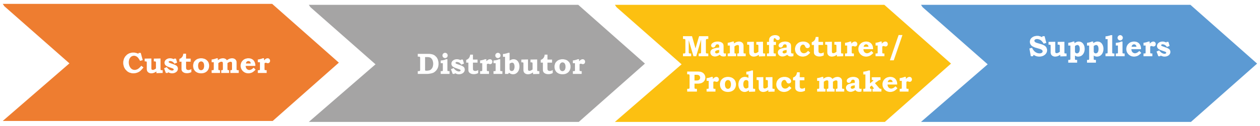


Fig. 1.3: Financial Flow in Supply Chain

Functions of supply chain

The supply chain consists of the manufacturer, suppliers, retailers, customers, transporters, warehouses, etc. Functions of supply chain are as follows—

- Inventory or record management
- Transportation service procurement
- Material handling
- Inbound transportation
- Transportation operation management
- Warehouse management
- Customer service
- Order processing and customer service

Kinds of supply chain

The common models of supply chain are—

- Integrated make-to-stock
- Build-to-order
- Continuous replenishment
- Channel assembly

Integrated make-to-stock model

This model is used to track client request in real time and production process, maintain finished goods inventory and storage of raw material.

Build-to-order model

In this, the company assembles the components to produce finished goods immediately upon receiving the order.

Continuous replenishment model

In this model, the company works with intermediaries and suppliers to constantly replenish their inventory. This is useful for the supply of products with stable demand. For example, circulation of prescribed medicines.

Channel assembly model

This model is a modification of build-to-order model. The fragments of the product are collected and assembled as the product moves through the distribution channel and it is called channel assembly model.

Importance of supply chain

The supply chain is important because it—

- helps to reduce inventory cost.
- helps to boost customer service and improve customer satisfaction.
- maintains better trust between partners.
- provides efficient manufacturing strategy.
- improves process integration.
- increases cash flow.
- reduces operating cost.
- improves financial position by decreasing fixed assets.
- improves quality and gives higher profit margin
- protects traditional freedom and development

Logistics

Logistics is the process involved in moving the goods from the point of origin to the point of consumption.

Any organisation has to improve and develop its supply chain and logistics (SC&L) processes to be successful and gain competitive advantage in the market. Measuring delivery performance is very important for a company to make its logistics system very effective. Logistics has been divided into two broad categories—

Inbound logistics

It is the most important process of logistics concerned with the movement of purchased raw material from the suppliers to the company.

Outbound logistics

It is the movement of finished products from the manufacturing unit (factory) to the end user (customer).

Practical Exercise

Activity 1

Prepare a chart showing the basic functions and requirements of supply chain and logistics.

Material Required

Note Book, Pen/Pencil, Check list

Procedure

1. Visit the warehouse along with your peers.
2. Meet the inventory executives and others and greet them.
3. Take a round of the warehouse and enquire from the manager about the following:
   - Suppliers of various products and their locations
   - Storage of the products
   - Local distributors of these products and their locations
   - Potential customers
   - Transportation facility used for the products
4. Discuss with the executive(s) about supply chain practices.
5. Show your notes to the executive and confirm that they are correct.
6. Prepare a report and discuss with friends and show it to the teacher.
7. Discuss your report in the class.

Activity 2

Visit to a post office to understand the difference between the public and private sector functionality.

Material Required

Note Book, Pen/Pencil, Checklist

Procedure

1. Visit the post office along with you peers.
2. Meet the postmaster and other employees in the post office.
3. Take a tour of the post office and enquire the post master about the following:
   - Point of collection and their locations
   - Storage facilities available for letters
   - Methods and criterion used to sort letters
   - Movement of letters (transport) and their final destinations
   - Distribution of letters to the recipients
   - Problems faced by postmen and other employees while working in the post office.
4. Discuss the working of post office with the employees.
5. Show your notes to the postmaster and confirm that they are correct.
6. Prepare a report and discuss it with friends. Also, show it to the teacher and present it in the classroom.

Check Your Progress

A. Fill in the Blanks

1. Supply chain consists of suppliers, manufacturers, distributors, ________________ customers.
2. There are two types of logistics; inbound and ________________.
3. Warehouse is a part of ________________.
4. Decision in regard to inventory and warehousing facilities is a part of ________________ decision.
5. Production and distribution schedules are the part of________________ decisions.
6. Flow of information in the supply chain is ________________.
7. Logistics is the relation between the ________________ and the operating activity of the business.

B. Multiple Choice Questions

1. The purpose of Supply Chain Management is to ____________________.
   (a) be responsible for customer satisfaction
   (b) increase product quality
   (c) integrate demand and supply
   (d) increase production
2. Logistics is involved with the onward and opposite flow of ______________________.
   (a) goods
   (b) services
   (c) cash
   (d) All of the above
3. The main decision areas in Supply Chain Management are _______________________.
   (a) location, production, distribution, inventory
   (b) planning, production, distribution, inventory
   (c) location, production, scheduling, inventory
   (d) location, production, distribution, marketing

C. True or False

1. Supply chains are becoming more complex and dynamic.
2. The information flows from seller to customer and then from customer to supplier.
3. Supply chain supports a company by reducing its inventory cost.
4. Inbound logistics is related to the movement of purchased raw material from suppliers to the company.
5. Outbound logistics is the movement of finished products from manufacturing unit to the final user.

D. Short Answer Questions

1. Define supply chain.
2. Explain various types of supply chain.
3. Discuss the three types of flow related to supply chain.
4. Deliberate the importance of supply chain.

E. Answer in Brief

1. Draw flow charts of material flow and financial flow.
2. Explain the functions of supply chain management with an example.
3. Demonstrate the importance of supply chain with an example.

SESSION 2: CONCEPTS OF LOGISTICS

Logistics is the process of planning, implementing and controlling procedures for the efficient and effective transportation and storage of goods. It includes movement of services and related information from the point of origin to the point of consumption. Its goal is to successfully meet the customer's requirements. This definition includes inbound, outbound, internal and external movements.

According to the Council of Logistics Management, logistics is the management process of planning, implementing, and controlling the physical and information flow concerned with material and final goods from the point of origin to the point of usage. International logistics involves the management of these resources in a company's supply chain across at least one international border.

Functions of logistics

The functions of logistics are given in the following chart (Fig. 1.4.)

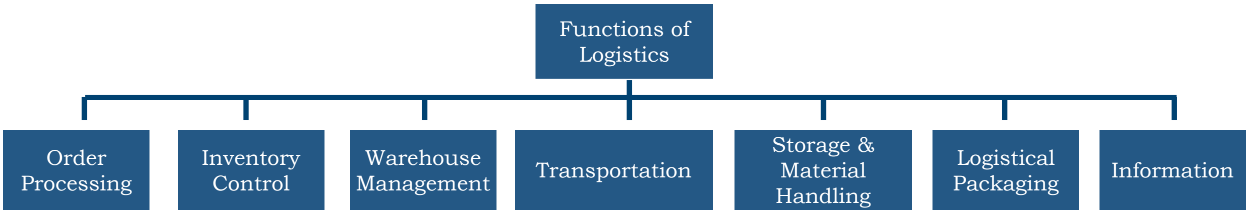
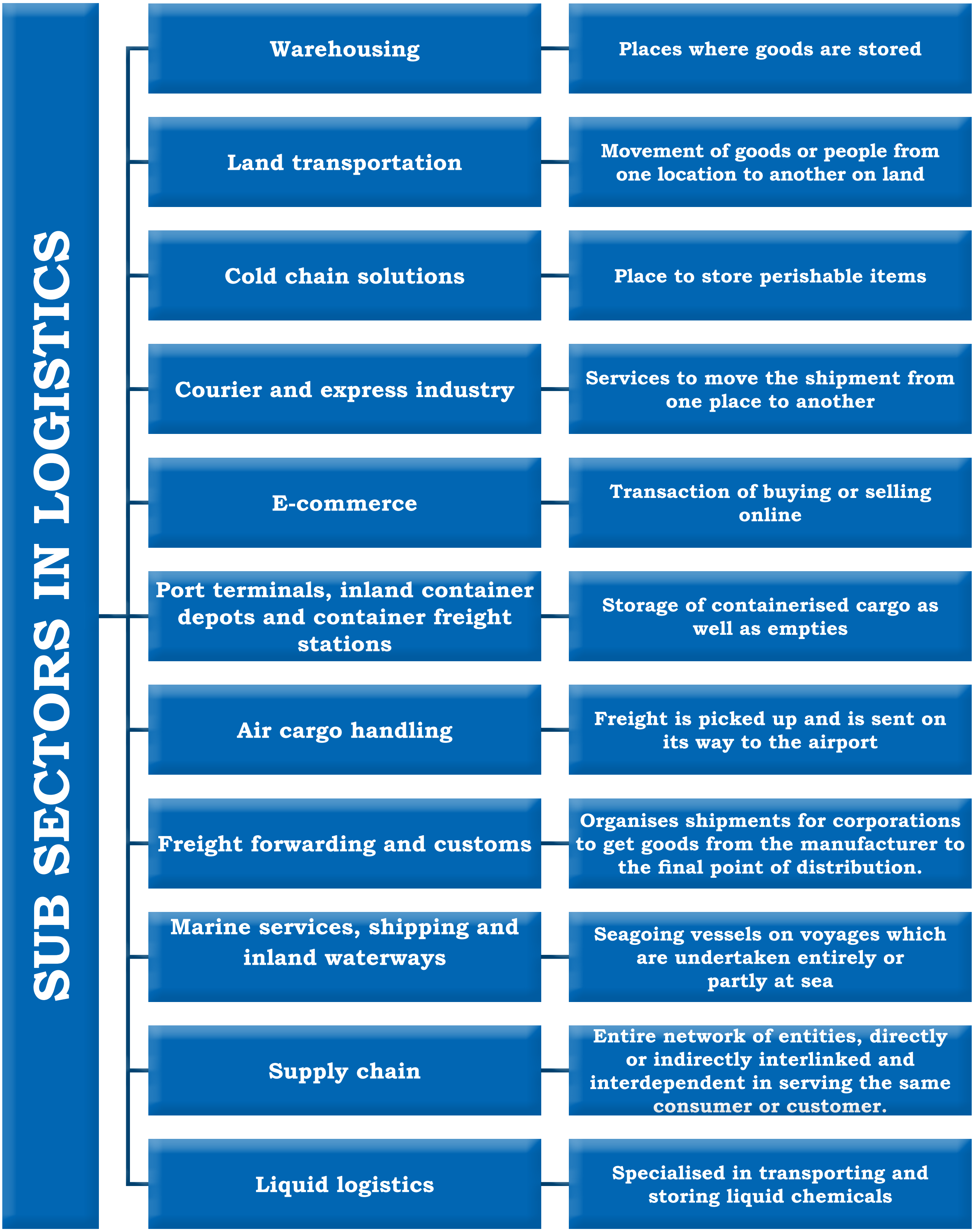


Fig. 1.4: Functions of Logistics



SUB SECTORS IN LOGISTICS	
Warehousing	Places where goods are stored
Land transportation	Movement of goods or people from one location to another on land
Cold chain solutions	Place to store perishable items
Courier and express industry	Services to move the shipment from one place to another
E-commerce	Transaction of buying or selling online
Port terminals, inland container depots and container freight stations	Storage of containerised cargo as well as empties
Air cargo handling	Freight is picked up and is sent on its way to the airport
Freight forwarding and customs	Organises shipments for corporations to get goods from the manufacturer to the final point of distribution.
Marine services, shipping and inland waterways	Seagoing vessels on voyages which are undertaken entirely or partly at sea
Supply chain	Entire network of entities, directly or indirectly interlinked and interdependent in serving the same consumer or customer.
Liquid logistics	Specialised in transporting and storing liquid chemicals

Fig. 1.5: Sub Sectors in Logistics

Order processing

It is a transaction between two parties, i.e., Purchase Order (PO) placed by a buyer to a seller. The process document holds its own importance because it has direct relation to the order. This order document indicates order date and delivery date to the customer.

Inventory control

Inventory control is the process of managing the inventory and striking a balance between the customer and the market.

Warehousing

Warehousing is a place used for storage. The finished goods or raw material are kept at this place.
The features of warehousing are—

- locality of warehouses and facilities
- number of warehouses
- size, mass or area of the warehouse
- warehouse layout
- ownership of warehouse

Transportation

The physical movement of goods from one place to another is known as the transportation of goods.

Storage and material management

The arrangement of goods in a specified area is known as storage material management.

Packaging

Packaging is the function of protecting the goods in the physical distribution process. It extends the life of the product without any damage.

Information

Information is shared from one place to another by using information technology tools.

Subsectors in logistics

As per the Logistics Sector Skill Council, there are 11 sub sectors operating in the entire logistics process, which are shown in Fig. 1.5.

The detailed information about sub sectors of the logistics sector is elaborated as follows.

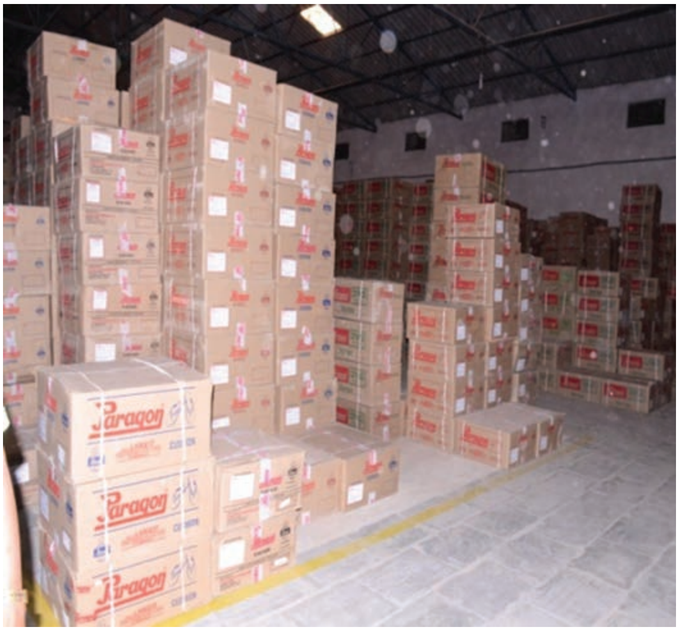


Fig. 1.6: Warehousing — Storage and Packaging

Warehousing—storage and packaging (including tertiary packaging)

In traditional warehousing, goods of durable nature were generally kept open. But in modern day warehousing, the goods are kept with suitable packaging (Fig.1.6). Therefore, packaging and storage are integral parts of warehousing.

Land transportation (including commercial vehicle drivers for cargo)

Land transportation, referred to as ground transport, covers the movement of goods from one location to another on land either by railways or by roadways (Fig. 1.7(a) and 1.7(b)).

Fig. 1.7(a) Land Transportation: Roadways

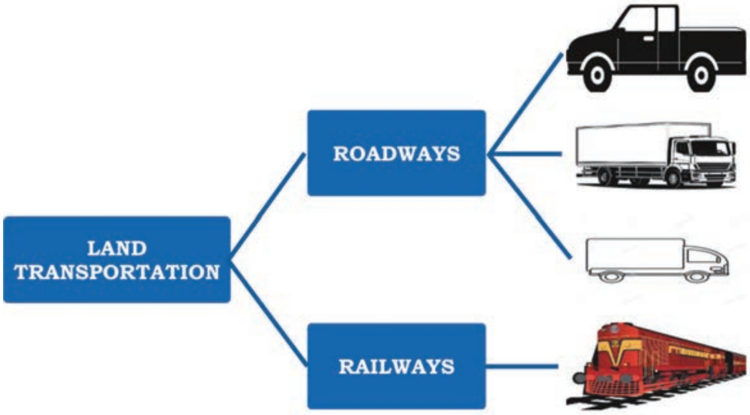


Fig. 1.7(b): Vehicles used in land transportation

Cold storage or cold chain solutions

A cold storage or cold chain is a temperature-controlled supply chain shown in figures 1.8(a) and 1.8(b). This is used to store various perishable products like fruits, vegetables, juices, etc.

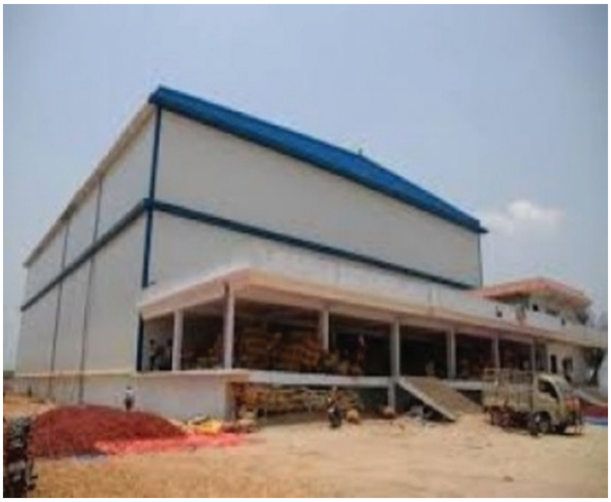


Fig. 1.8(a): Cold Storage

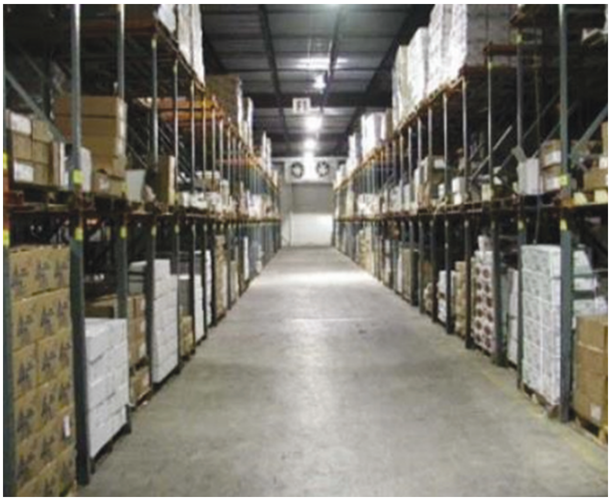


Fig. 1.8(b): Cold Storage and Cold Chain Solution

Courier and express industry

Courier is a service industry under which the transfer of goods and services is done (figure 1.9). It is an everyday service.

Fig. 1.9: Courier Services

E-commerce (e-logistics)

E-commerce is an activity of using e-services (internet and mobile). E-logistics is a combination of message computing and collective technologies to deliver the right products in right quantities at the right place and time to the right customer (figure 1.10).

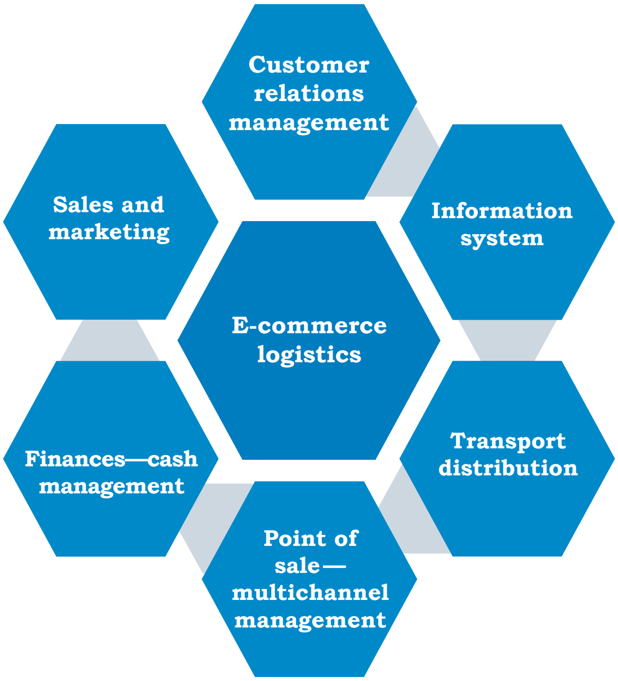


Fig. 1.10: E-commerce

Port terminals, inland container depots and container freight stations

- Port Terminals: A port is a location on a coast, where ships can dock and transfer people or cargo to or from the land (figure 1.11a).
- Inland Container Depots (ICDs): ICDs, also called as dry ports, are prepared for handling and storage of containers (figure 1.11b).
- Container Freight Station (CFS): A facility where freight shipments are combined or de-consolidated and showed between transport legs (figure 1.11c and 1. 11d).

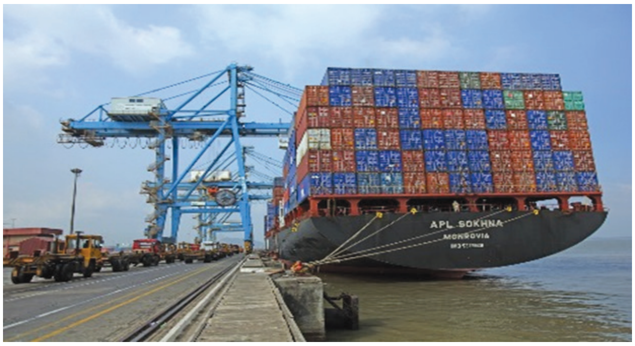


Fig. 1.11(a): Port Terminals

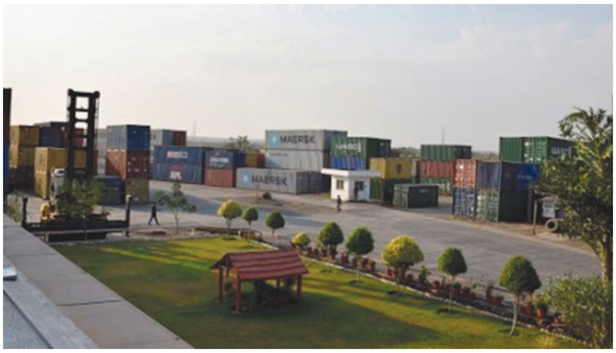


Fig. 1.11(b): Inland Container Depot

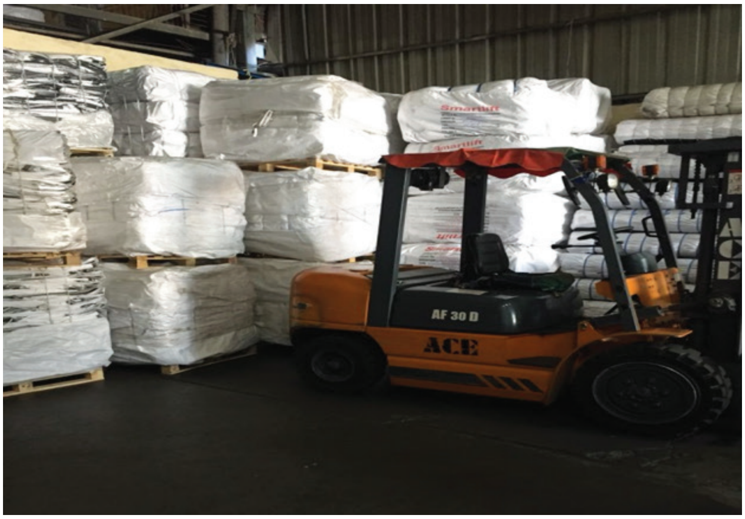


Fig. 1.11(c): Forklift for putting Goods in Container

Fig. 1.11(d): Container Freight Station

Air cargo handling (other than tarmac side operations)

Air cargo is the term used to refer to the goods through aircraft. Goods which have less weight and are highly valuable are sent through air cargo (figure 1.12).

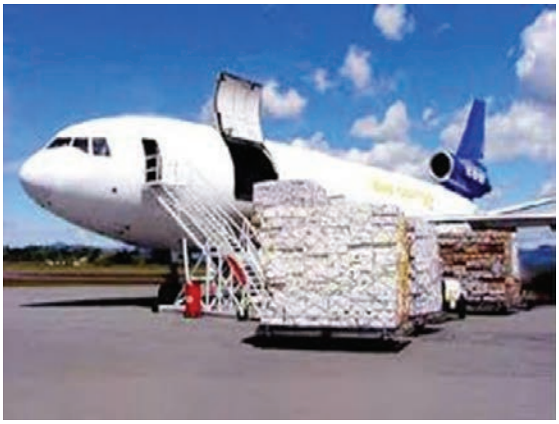


Fig. 1.12: Air Cargo and its handling

Freight forwarding and customs

Freight forwarding refers to the managing and shipping of goods from one destination to another via various carriers, such as, air, marine, railway or highway (figure 1.13).

Fig. 1.13: Coordination of freights

Marine services, shipping and inland waterways

Services related to the port, conducted to ensure the safe movement of goods through ships are called marine services (figure 1.14).

The terminology 'shipping' is not only limited to the seaborne trade but has progressed to the land and air based transportation of goods.

Inland waterways are a network of canals, rivers, backwaters and creeks which can be used for land transportation (roads and rails) (Figure 1.15).

Fig. 1.14: Marine Services at Sea Port

Fig. 1.15: Shipping the Goods

Supply chain

A supply chain is a network among a business organisation and its suppliers to produce and distribute the precise product to the end user. This network comprises different people, entities, activities, resources and information. The supply chain furthermore represents the stages it takes to acquire the product or service from its unique state to the customer.

Companies develop supply chains so that can decrease their costs and keep up to the competition with their business rivals. (Figure 1.16)

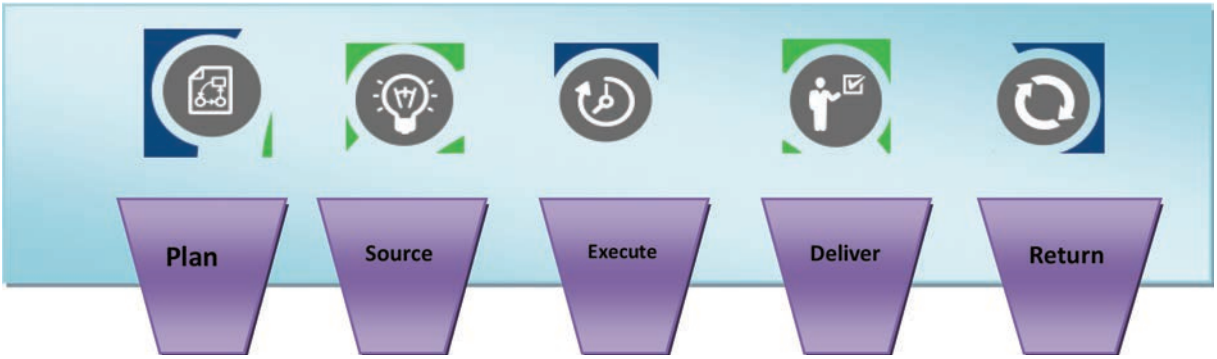


Fig. 1.16: Supply Chain Process

Liquid logistics

It is associated with the movement of liquids or gases from one place to another like petrol, diesel, gases, etc. It is a specialised material-handling and transportation discipline (Fig. 1.17). Precaution is written on the vessels to warn people to handle it with care because of the risky nature of the products.

Fig. 1.17: Liquid Logistics Vessels

Correlation of subsectors in logistics

The sub sectors of logistics are interrelated. Each sub sector is directly or indirectly interdependent. Logistics help to facilitate the goods movement from the start to the end (Figure 1.18).

Relationship between logistics and warehousing

Logistics is the process of scheduling, supervising, and application of goods from the storage to selling of the product to the end customer. Warehousing means holding inventory in a specific location. Positive relation between logistics and warehousing is the equalising point where things and ideas can be delivered from production to the user whereas the difference lies only in aspect. Logistics and warehousing have similar functions, which facilitate the supply chain.

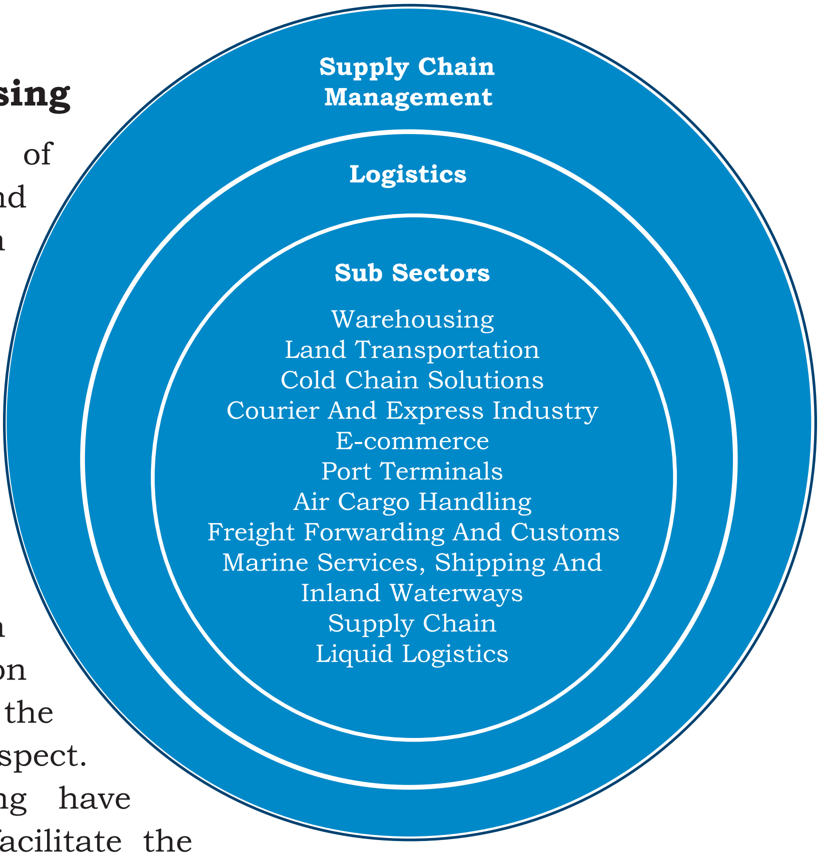


Fig. 1.18: Correlation of Sub Sectors

Practical Exercise

Activity 1

Draw a flow chart containing the sub sectors of the warehousing industry.

Material required

Check list, notepad, pen/pencil, drawing sheet, colour pencils, etc.

Procedure

1. Collect the material required to make the flow chart.
2. Draw a chart containing sub sectors of warehousing on a sheet.
3. Check the characteristics from the textbook and from what the teacher has taught in class.
4. Ensure that you complete your work.
5. Discuss with your classmates in presence of your teacher.
6. Write the conclusion.

Activity 2

Draw a flow chart to correlate logistics with warehousing.

Material required

Check list, notepad, pen /pencil, drawing sheet, colour pencils.

Procedure

1. Collect the material required to draw the flow chart.
2. Draw a chart desribing warehousing and correlate it with logistics industry.
3. Check the characteristics from the textbook and from what the teacher has taught in class.
4. Ensure that you complete your work.
5. Discuss with your classmates in front of the teacher.
6. Write down the conclusion.

Check Your Progress

A. Fill in the Blanks

1. ____________________ is the act of storing goods.
2. Movement of goods from one place to another place is called ____________________ transportation.
3. Warehouse is an important activity of _______________ function.
4. A ____________________ supply chain is temperature-controlled.
5. A ____________________ facilitates the stacking and unloading of goods at ships.

6. ________________ is carried in an aircraft.
7. ________________ is a specialised material-handling discipline used for liquid products through a supply chain.

B. Multiple Choice Questions

1. The process of logistics is ________________.
   (a) planning
   (b) implementing
   (c) controlling
   (d) All of the above
2. ________________ is a critical component in the physical distribution of a product.
   (a) Industrial packaging
   (b) Logistical packaging
   (c) A and B both
   (d) A only
3. How many sub-sectors are there in logistics?
   (a) 10
   (b) 20
   (c) 11
   (d) 12
4. A cold chain is a ____________ controlled supply chain.
   (a) temperature
   (b) monitor
   (c) environment
   (d) None
5. Air cargo comprises of _____________.
   (a) air freight
   (b) air express
   (c) airmail
   (d) All the above

C. State whether True or False

1. A warehouse cannot store goods.
2. Supply chain and logistics are related to each other.
3. The term 'shipping' is used to explain the movement of goods through ships between two points.
4. Marine services are port-related activities.
5. Customs department is authorised by the government for implementing the policies.
6. Air cargo is carried in an aircraft.

D. Answer in Brief

1. What is logistics?
2. Explain briefly about the sub-sectors of logistics.
3. What is the difference between land logistics and liquid logistics?

NOTES

4. What is a marine service?
5. Draw a flow chart of supply chain process.

E. Check your Performance

1. Draw a flow chart containing the list of subsectors in logistics.
2. Differentiate between warehousing and logistics.

Session 3: Fundamentals of Warehousing

Storage is as important as the manufacturing, marketing and transportation of goods. Storage involves receipt, identification, verification, sorting, putting away and retrieval for issue and even maintenance of goods. Thus, warehousing is a combination of various activities performed in accordance with each other. This session provides an insight into the basics of warehousing.

Meaning and definition of warehousing

Any goods, whether raw material or finished products, have to be stored during the course of production, consumption or delivery. While going from a manufacturer to the final consumer, a product gets transferred at various levels and it has to be stored and transported from one level to another, as shown in Figure 1.19.

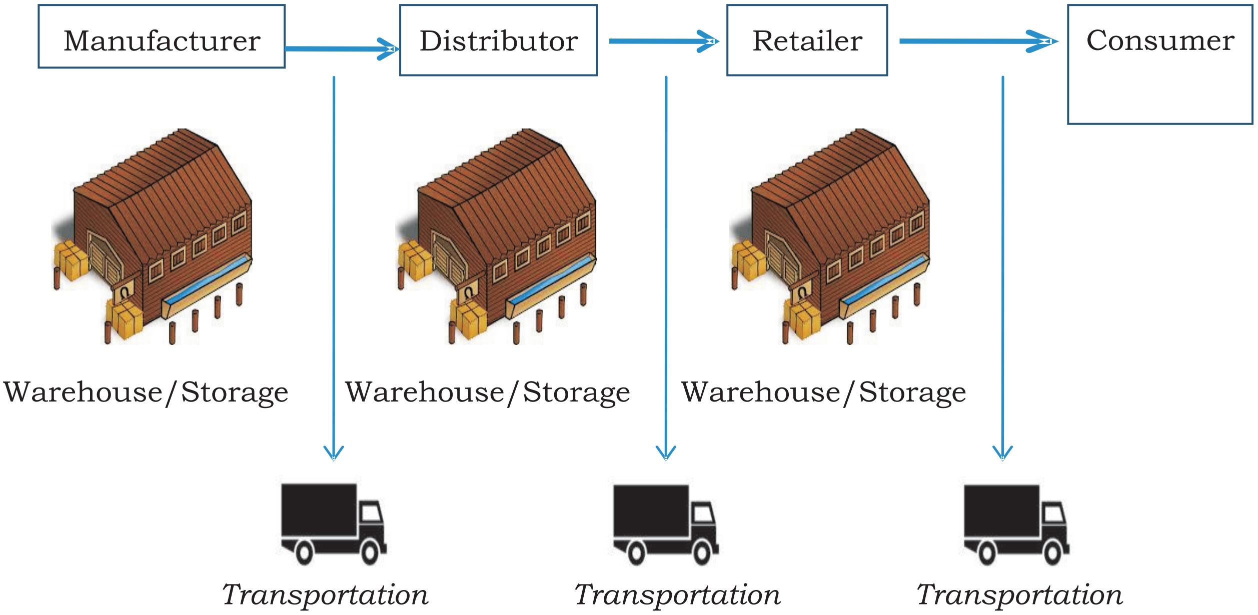


Fig. 1.19: Warehousing at Different Stages

This process of storage is termed as warehousing, and the place where the goods are stored is known as a 'warehouse'. So, we can say;

Warehouse is a planned commercial space for well-organised storage and management of products. Warehousing is the process of storage, handling and management of goods in a warehouse.

Warehousing is an important function of logistics. This facility is availed by the traders, manufacturers, exporters, importers, transporters, agriculturists, etc. Thus, it can be said that a warehouse provides storage solutions to a number of clients having an extensive range of products. There are specialised warehouses for specific kind of products.

Notes

Necessities for warehousing

Storage is an essential activity for many business houses. Goods are stored to avoid sudden shortage. In order to avoid a situation, such as, price rise or sudden surge in demand, warehousing of goods is a good idea. Raw material also needs to be stored to maintain the production cycle during off seasons.

Warehousing is needed—

- to safeguard against the condition of loss of production.
- to achieve mass production in order to reduce overall cost.
- to acquire the goods in bulk instead of buying in small batches and pay more.
- to provide sufficient stock during uncontrollable situations, such as, sudden price rise or variations in demand and supply.
- to maintain the availability of spares and adequate service items.
- to provide a safe storage environment to the goods with a guard from damage, deterioration and unauthorised usage.
- to keep proper inventory record.
- to enhance a company's goodwill with efficient warehouse handling systems.

Types of warehouses

There are various types of warehouses available in India, which can be classified as—

1. Private

The warehouses which are owned and managed by the manufacturers or traders to exclusively store their own stock of goods are known as private warehouses.

2. Public

The warehouses which are used to store goods of the general public are known as public warehouses.

3. Government

The warehouses which are owned, managed and controlled by central or state governments or public corporations or local authorities are called government warehouses.

4. Bonded

A bonded warehouse is a secure warehouse in which goods are stored until customs duty is paid or the goods are cleared for export.

5. Co-operative

The warehouses which are owned, managed and controlled by co-operative societies are called co-operative warehouses.

Characteristics of ideal warehouses

A warehouse is said be an ideal one if it possesses the following characteristics—

- The warehouse should be located at a convenient place near highways, railway stations, airports and seaports where goods can be loaded and unloaded easily.
- Mechanical appliances should be available for loading and unloading the goods. This reduces the wastage in handling, and also minimises the handling costs.
- Adequate space should be available inside the building to keep the goods in proper order.

- Warehouses meant for the preservation of perishable items like fruits, vegetables, eggs, butter, etc., should have cold storage facilities.
- Proper arrangement should be there to protect the goods from sunlight, rain, wind, dust, moisture and pests.
- Sufficient parking space should be there inside the premises to facilitate easy and quick loading and unloading of goods.
- Round the clock security arrangement should be there to avoid the theft of goods.
- The building should be fitted with latest fire-fighting equipment to avoid the loss of goods due to fire.

Benefits of warehousing

The benefits of warehousing are given below and shown in Figure 1.20.

- Location advantage: Warehousing provides a central location for storing and distributing products. This location is generally at a reasonable distance from the supplier and the buyer.
- Storage benefits: Goods can be stored in a controlled and safe location. Even if the consumable good is of seasonal nature, it can be produced during the whole year and can be stored for sale during the season of demand.
- Consolidation: Goods from several suppliers can be received in one warehouse and can be transported as a single bulk consignment to the buyer.
- Value addition: Value addition of the products such as packaging and

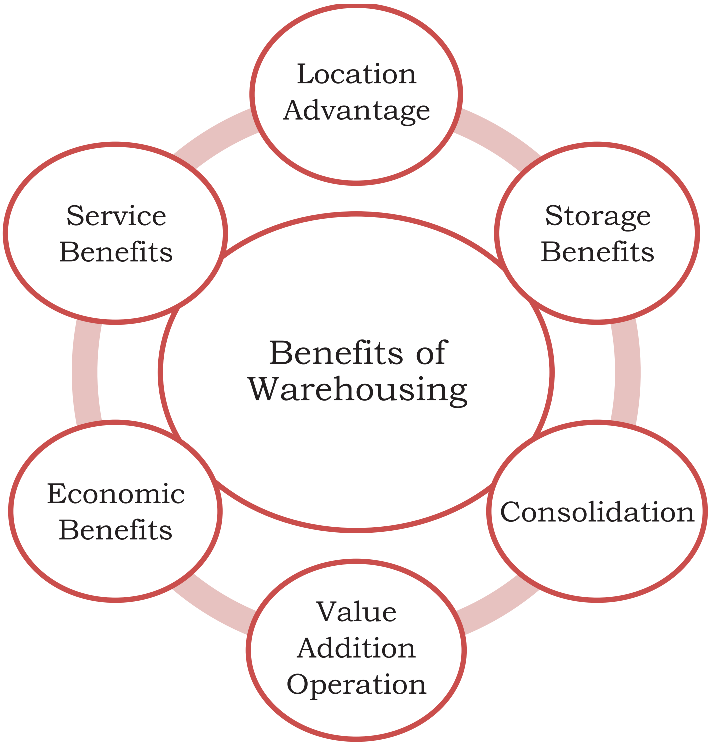


Fig. 1.20: Benefits of Warehousing

labelling is also done in the warehouse to reduce the operational time.

- Economic Benefits: Warehouses provide economies of scale (benefit of large scale production) to the manufacturer and buyer. This reduces their cost of operation.
- Service benefits: It provides the benefit of safety stocking.

Aims of warehousing

1. Storage—keeping goods in a safe and secured environment.
2. Safety—to ensure damage free and error free storage environment.
3. Utilisation of resources—for effective distribution of stored material.
4. Facing unprecedented conditions—For overcoming the situations, such as, sudden shortage of raw material.

Aims of warehousing are summarised in Figure 1.21.

Fig. 1.21: Aims of Warehousing

Principles of warehousing

An effective warehousing should be based on the following principles—

1. Utilisation of space: Complete space in a warehouse should be utilised and no space should be wasted. Vacant space in a warehouse means loss of revenue to the warehouse.
2. Optimum stock levels: Both excess stock level, as well as, low stock level are disadvantageous for the warehouse. Excess stock directly leads to extra cost, and holding less stock results in loss of sales. Optimum quantity of stock has to be maintained.
3. Process orders quickly: Faster order processing of a company largely depends upon an efficient warehousing system. The process of receipt,

binning, value addition (packaging and labelling), despatch and transportation should be conducted uninterrupted and in connection with each other to avoid delays. Warehouse Management System (WMS) helps a lot in speedy processing of orders.

4. Timely entry-exit of products: The time between order receipt and delivered goods (turn-around time) should be minimised so as to achieve efficiency of operation.
5. Control the movement and storage of material: Accurate detailing of stock levels and the correct fulfillment of orders is an important aspect of assuring effective warehouse operations. Controlling stock and recording the incoming and outgoing of cargo along with maintaining conducive storage conditions is an important principle of warehousing.
6. Warehousing works in a system: Warehousing is an important aspect of the supply chain. The other aspects of supply chain, such as, logistics, material management, physical supply of goods, etc., work hand in hand with each other and no function can work in isolation. All components have to work together in consensus to ensure fruitful completion of the logistics process.
7. The basic motive of warehousing is to store goods. There are various other activities, such as, value addition, packaging, labelling, etc., that are conducted in a warehouse. Warehousing operations involve successful completion of all allied functions along with the storage. Thus, we can say that warehousing is a complete functional system. There are different types of warehouses depending upon the type of goods they store and type of facilities they offer. The next session gives an insight about the different types of warehouses used during the logistics process.

Notes

Practical Exercise

Activity 1

Visit a warehouse and note down the fundamental aspects of warehousing.

Material required

Check list, notepad, pen/pencil

Procedure

1. Plan a visit to the warehouse.
2. Greet the warehouse managers and executives including all who are present there.
3. Note down the different activities of the warehouse.
4. Understand the fundamental aspects of warehousing from the people working at the warehouse.
5. Note down the fundamentals in a notebook, review it with friends and finalises by consulting the executives.
6. Discuss the fundamentals of warehousing in the class.
7. Ask the teacher to comment on the discussion.
8. Teacher will conclude the discussion.

Activity 2

Visit a warehouse of FCI to identify the needs of warehousing.

Material required

Notepad, pen/pencil, check list

Procedure

1. Visit a warehouse of FCI.
2. Greet the warehouse managers and executives and all who are present there.
3. Request them to explain the needs of warehousing.
4. Note down the needs of FCI warehousing and review it with friends and finalise in consultation with the executives.
5. Discuss the needs of warehousing in the class.
6. Ask the teacher to comment on the discussion.
7. Teacher will conclude the discussion.

Activity 3

Prepare a report on the benefits of a warehouse.

Material required

Notepad, pen/pencil, check list

Procedure

1. Arrange a group discussion in the class.
2. Students will give their views on warehouses.
3. Note down the several benefits of warehousing.
4. Prepare a short report on its benefits.
5. Submit the report to the class teacher.
6. Teacher will analyse the report and write comments.

Check your progress

A. Fill in the Blanks

1. The process of storage is termed as ______________ and the place where the goods are stored is called as ____________________.
2. There are ____________________ warehouses for specific kind of products.
3. Goods from different suppliers can be received in one warehouse and can be transported as a single bulk consignment to the buyer. This is called____________________.
4. The time between receipt of delivery and receipt of order is called ______________________.
5. Warehousing is an important activity of ____________________ function.

B. Multiple Choice Questions

1. Storage of goods is as important as_________________.
   (a) manufacturing
   (b) marketing
   (c) transportation
   (d) All of the above
2. Warehouse is a planned ____________________ space for efficient storage.
   (a) commercial
   (b) official
   (c) both (a) and (b)
   (d) None of the above
3. The benefits of warehousing are ___________.
   (a) economic
   (b) storage
   (c) service
   (d) All of the above
4. The basic motive of warehousing is to ________________.
   (a) store goods
   (b) lose goods
   (c) damage goods
   (d) store goods affected by pesticides
5. Warehousing facility is availed by ________________.
   (a) trader
   (b) manufacturer
   (c) importer
   (d) exporter

C. State whether True or False

1. Warehouse provides storage solutions for a large number of clients.

2. Packing is not a function of warehouse.
3. Warehousing is an integral part of logistics.
4. Warehousing works as a part of a system.
5. Effective resource utilisation is not an aim of warehousing.

D. Answer in Brief

1. What is warehousing?
2. Discuss the aims of warehousing.
3. What are the various benefits attached to the warehousing process?
4. Discuss the various principles of warehousing.
5. Write a short note on the needs of warehousing.

E. Check your Performance

1. Draw a chart on the services of warehouse and display in the class.
2. Identify the various components of the warehouse design.
3. Demonstrate the operational steps followed in warehousing.

Session 4: Functions and Classification of Warehouses

Warehousing is often seen as contributing to the storage of goods only. A warehouse serves as a storage and processing area and also sometimes as the location for reaching the customers. There are various operations performed in a warehouse. It is important to understand the overall warehouse operations and the various functions performed in a warehouse.

Warehouses can be categorised on the basis of the type of product, value-added services required, duty or taxes payable, location, etc. This session talks about different types of warehouses and the features attached to them. Choosing the correct category of warehouse is important for the storage and handling of goods.

Functions of warehousing

Storage is not the only purpose of setting up a warehouse. But, there are various other activities that take place in a warehouse, such as, security, processing, value addition like packaging, etc. So, in broad terms these functions are also included in warehousing. It is very important to understand the various functions performed in a warehouse.

Following are the three primary functions performed in a warehouse.

Storage	Movement	Information Management
• Stock of products at the warehouse – Order or consignment – Shipping – Receiving – Put-away	• Put the products at the selected place • Rearranging goods • Relocating by using transport • Receipt of goods from place of production • Shifting to the warehouse	• Record keeping • Documentation • Application of information technology and software for information management

The secondary functions (Fig. 1.22) of warehouse are—

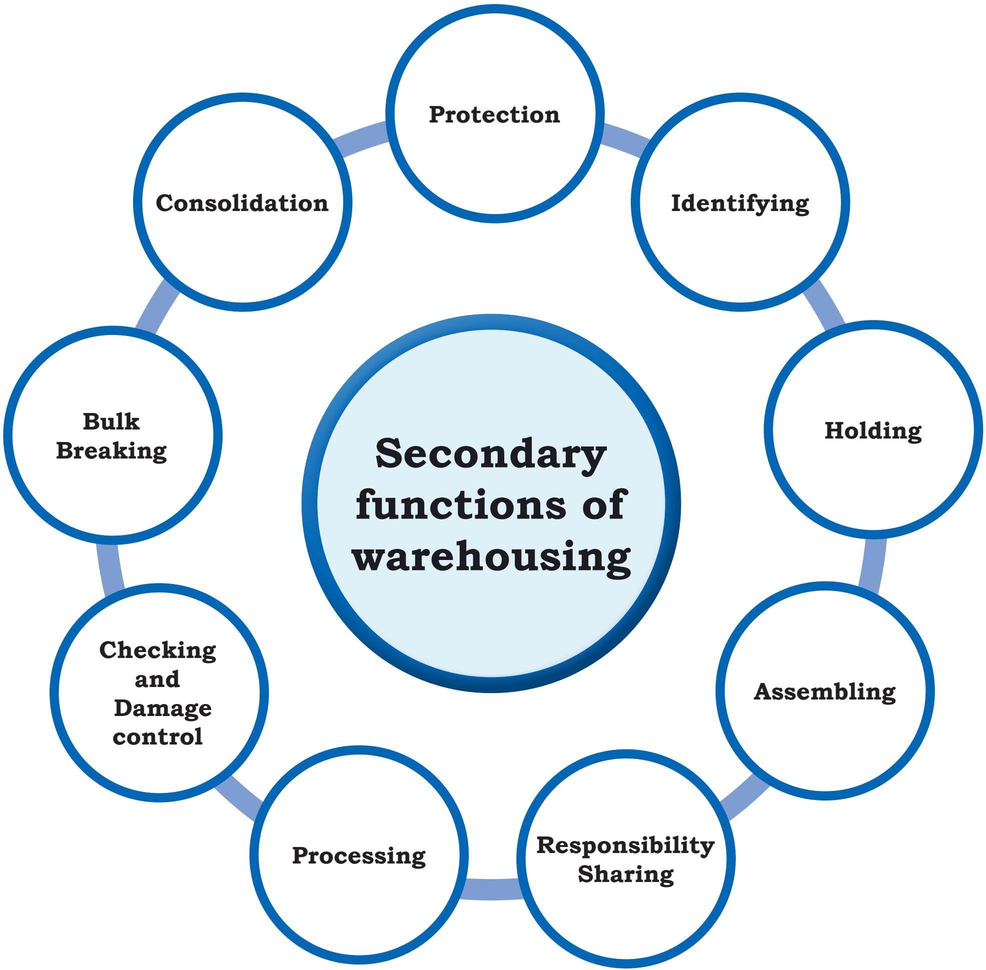


Fig. 1.22: Secondary Functions of a Warehouse

1. Protection of goods: Warehouses provide protection to goods against loss and damage arising due to theft, fire or mishandling.
2. Responsibility and liability sharing: The responsibility of a binner is to protect the goods from damage and provide security. All these functions are taken up by the warehouse, once the goods enter into the premises.
3. Processing: Warehouse also provides an option of processing to the manufacturers. Certain goods have to be worked upon before final consumption, such as, paddy is polished, processed foods are labelled, etc.
4. Checking and damage control: Many times goods are checked for damage or maintenance in the warehouse. Preventative and corrective measures are implemented accordingly on the products. For example, anti-termite treatment on wooden products, pest control treatment on agro-based products, anti-rust coating on iron and metallic products, etc.
5. Breaking the bulk: Goods are generally received in bulk inside a warehouse. These are distributed in small batches as and when required by the distributor. Dividing the bulk lot into smaller batches is termed as breaking the bulk.
6. Consolidation: Small lots of goods are combined to form a single big lot. Warehouses often act as a consolidation point where supplies from various suppliers are collected and combined into a single lot for further transportation to a single buyer.
7. Identifying: Warehouses receive goods and identify them to store at a particular location and space suitable for the inventory.
8. Holding: Holding of goods is a major function of the warehouse. Goods received in a warehouse are meant for further transportation in future. But sometimes, due to different reasons goods remain idle in a warehouse.
9. Assembling: Warehouses often act as an assembly point where supplies from various suppliers are

collected and combined into a single lot for further transportation to a single buyer.

Activity for functions of the warehouse

1. Inbound receipt of goods from upstream suppliers.
2. Identifying the merchandises, matching them to orders for finding their use.
3. Unloading material from delivery vehicle.
4. Doing necessary checks on quality, quantity and condition.
5. Labelling materials so that they can be identified easily. Usually this can be completed through bar codes.
6. Sorting the goods as needed.
7. Moving goods to bulk storage area.
8. Holding them in stock until needed.
9. When necessary, moving goods from bulk storage area to a smaller picking store.
10. Picking materials from this store to meet orders.
11. Moving the materials to a marshalling area.
12. Assembling materials into orders.
13. Packing and packaging as necessary.
14. Loading delivery vehicles and despatching orders.
15. Controlling all communication and related systems, such as, inventory control and finance.
16. Consolidation activity and break-bulk activities also form a part of warehousing activities apart from regular activities.

As warehousing is a system, it cannot be performed individually in isolation. All the functions have to go hand in hand to ensure efficient completion of the warehousing process. The overall objective of efficient storage and accruing customer satisfaction can be achieved only when all the functions are performed in order and to the fulfilment of their objectives.

Classification of warehouses

There are a number of ways in which warehouses can be classified. The selection of warehouse is based on

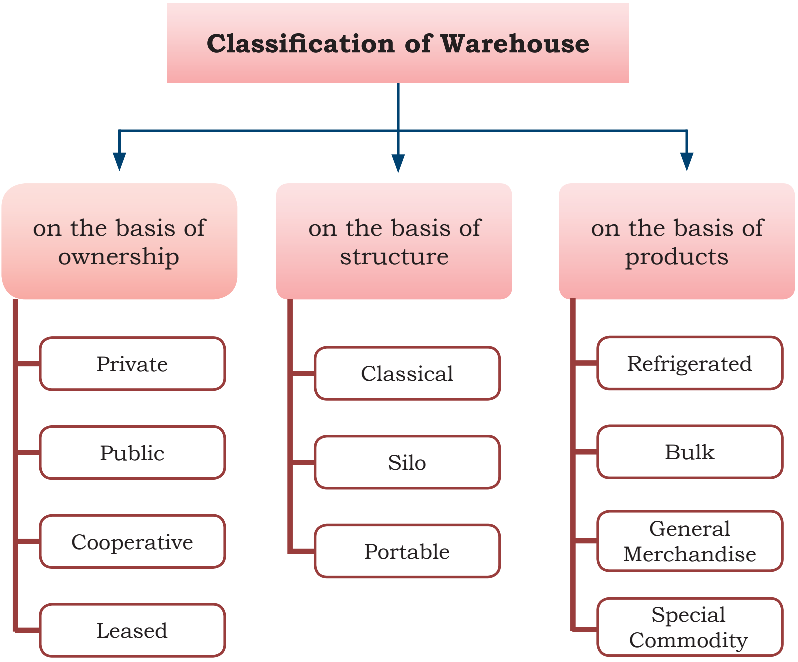


Fig. 1.23: Classification of a Warehouse

consideration of several factors, such as, type of product, location, structure, etc., as shown in Figure 1.23.

Classification on the basis of ownership

(a) Private warehouse: This is owned by a firm or a company. Large scale companies with large scale operations setup their own warehouse.

(b) Public warehouse: These are government owned warehouses. Storage space is booked by any company or business entity and the due fee is paid to the warehouse. Central Warehousing Corporation is an example of such a warehouse in India. These are the best warehousing agencies in India, and operates 438 warehouses across the country.

(c) Cooperative Warehouse: These are owned, controlled and managed by co-operative societies. These provide storage space to members at a nominal fee.

(d) Leased Warehouse: This is a warehouse which can be hired (whole premises) on lease or rent as and when required.

Classification on the basis of structure

(a) Classical Warehouse: It is a single building divided into rooms or sections by concrete walls. It is a common form of warehouse.

(b) Silo: These are vertical units with options to store bulk items. Use of mechanical devices is highly prevalent. These are used for bulk storage of grain, coal, cement, carbon black, woodchips, food products and sawdust. (Fig.1.24)

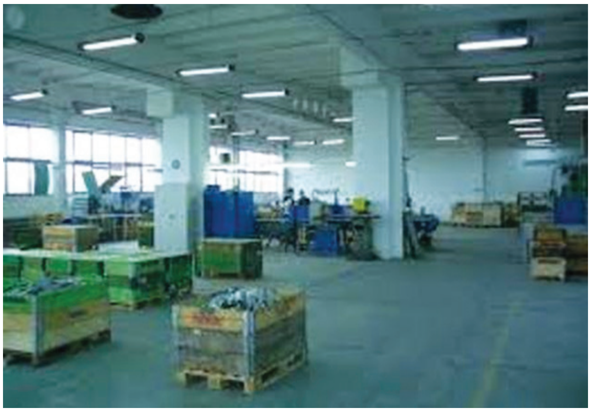


Fig. 1.24: Modern Silo Warehouse

(c) Portable Warehouse: It is a type of temporary warehouse which can be built or transferred easily. Generally, it is a fabricated structure or shipping containers used for temporary storage of goods. (Fig. 1.25.)

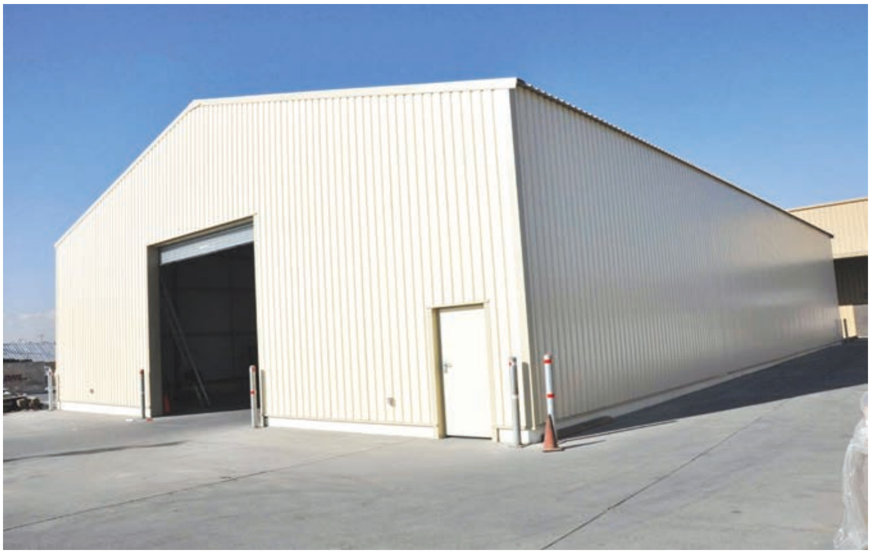


Fig. 1.25: A Portable Warehouse

Classification on the basis of products handled

(a) Refrigerated Warehouse: It is a temperature-controlled warehouse specifically set up to store perishable items. Generally, processed foods, agricultural commodities, pharmaceutical products and cut flowers are stored in this type of warehouse. (Fig. 1.26)

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Fig. 1.26: Refrigerated Warehouse storing Cut Flowers

(b) Bulk Warehouses: These are used to store bulk items, which are generally not packed, such as, wooden logs, scrap, sand, coal, grains, etc. (Fig. 1.27)

Fig. 1.27(a): Bulk Warehouse

Fig. 1.27(b): Bulk Warehouse

(c) Special Commodity Warehouse: These are used to store specialised goods, such as, tobacco, cotton, wool, wheat, etc., which might need temperature and pressure may control depending upon the requirement. (Fig. 1.28)

Fig. 1.28: Specialised Tanks for Storing Natural Gas

(d) General Merchandise Warehouse: Goods which do not require any special storage facilities are stored in these warehouses. For example, tires, rubber mats, etc. It has racks or shelves for stacking items or it can have a big hall for storing goods. (Fig.1.29)

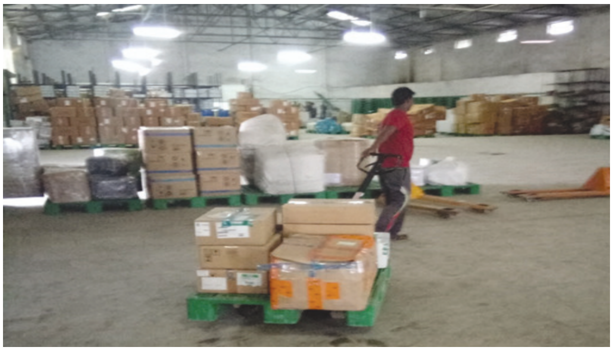

Fig. 1.29: General Merchandise Warehouse

Classification on the basis of operations

(a) Manual Warehouse: This warehouse uses manual handling of goods. Manpower, rather than machines, are used in this warehouse. Thus, the time and cost of operations is high [Fig. 130 (a)].

(b) Mechanised Warehouse: This warehouse uses machines for handling and storage operations. Cranes, forklift, trucks, conveyer belts and mechanical movers are used in place of man power. [Fig.1.30 (b)].

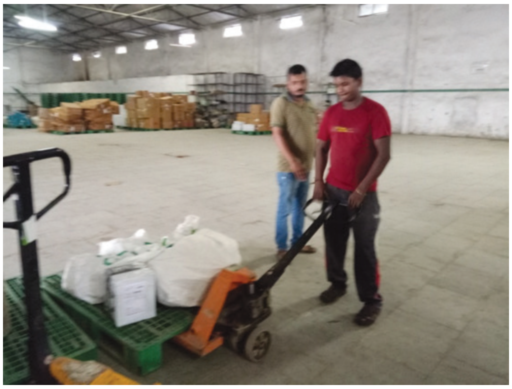

Fig. 1.30(a): Manual Warehouse

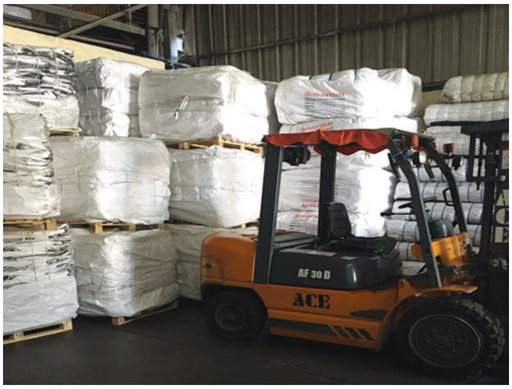

Fig. 1.30(b): Mechanised Warehouse

Classification on the basis of location

(a) Production Centered Warehouse: These are positioned near the production facility. These are usually used to store raw materials, spares and intermediate supplies.(Fig. 1.31).

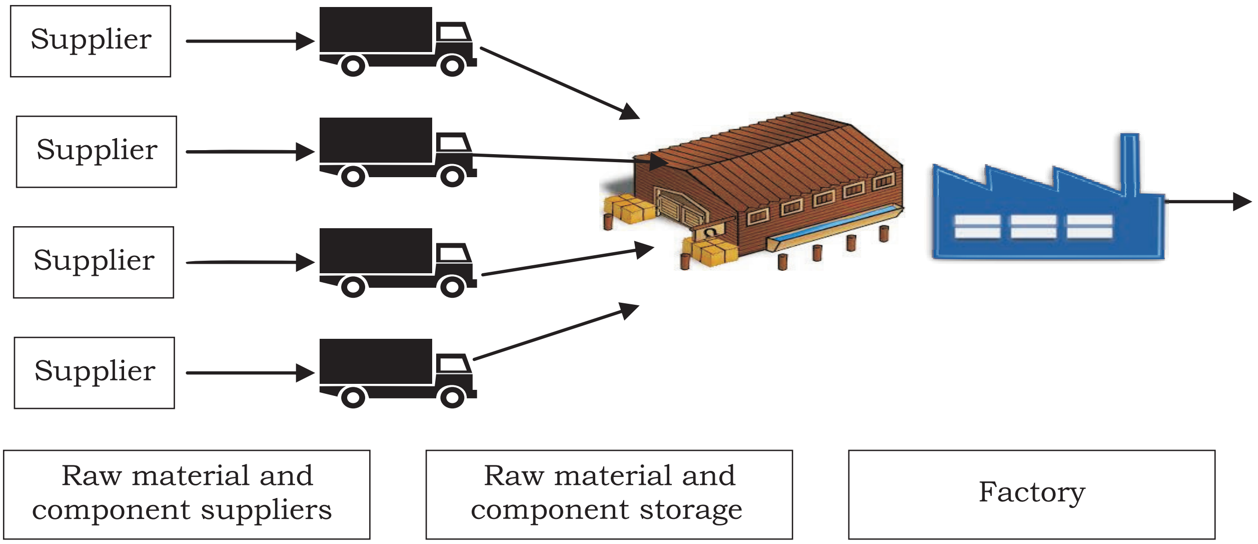
Supplier
Supplier
Supplier
Supplier
Raw material and component suppliers
Raw material and component storage
Factory

Fig. 1.31: Production centered Warehouse

(b) Market Centered Warehouse: These are located near the market area or distribution centers. These are generally used to store final products and spares for after sales service. (Fig. 1.32).

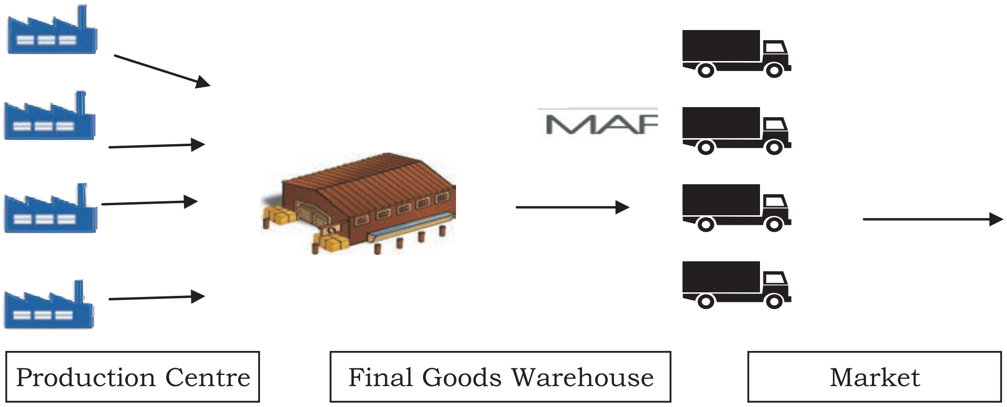

Fig. 1.32: Market centered Warehouse

Warehouse in motion

These warehouses are on wheels. Train wagons, ships or trailers are used as storage points to reduce the time of transportation to reach the final destination. Sometimes, even processing is done on the way to save time.

Others

Combination Warehouse: This type of warehouse is a pictorial combination of two or more types of warehouses mentioned above. For example, a private, refrigerated, market centered warehouse.

Practical Exercise

Activity 1

Identify the types of warehouses in a given situation.

Material required

Notepad, pen /pencil.

Procedure

1. Consider yourself to be the trader of the products listed in No. 3.
2. Take a group of six students from your class and give them the list of the mentioned products along with a pen and notedpad.
3. Ask them what type of warehouse would you use for the storage of each of the given products? Write the functions of each warehouse.
    (a) Cold drink- ______________________________
    (b) Sand- ______________________________
    (c) Natural gas- ______________________________
    (d) Garments-______________________________
    (e) Pickles -______________________________
    (f) Newspaper -______________________________
4. In the end discuss all the answers in the class.

Activity 2

Classify the goods and their respective warehouses in a given situation.

Material required

Notepad, pen /pencil

Procedure

1. List the type of goods stored in a warehouse.
2. Draw a table containing various types of warehouses.
3. List the goods on the basis of warehouses.
4. Submit the chart to the teacher.

5. Ensure that your work in complete.
6. Discuss with your classmates in front of your teacher.
7. Write the conclusion.

Check Your Progress

A. Fill in the Blanks

1. Food and beverages are stored in ____________________ warehouses.
2. Warehouses owned by individual companies are known as ______________.
3. A private-refrigerated warehouse is a type of _________ warehouse.
4. Market centered warehouses store ________________.
5. ____________________ warehouses use labours whereas ____________________ warehouses use machines for handling goods.

B. State whether True or False

1. Silo is used for storage of grains.
2. Layout is not important for warehousing.
3. Public warehouse is owned by the government.
4. Space is not a constraint for warehouse.
5. Private warehouses can be hired by any trader.

C. Multiple Choice Questions

1. Warehouse layout _________________________.
   - (a) varies according to the types of operations performed in the warehouse.
   - (b) varies according to the type of commodity handled in the warehouse.
   - (c) is always the same.
   - (d) Both (a) and (b).
2. Objectives of warehouse layout are __________________.
   - (a) storage
   - (b) cubic capacity utilisation
   - (c) protection
   - (d) Both (b) and (c)
3. Which of the following is not a part of warehousing layout?
   - (a) Arrival bay
   - (b) Manufacturing bay
   - (c) Storage bay
   - (d) Shipping/departure bay
   - (e) Office

4. Natural gas is stored in ____________________.
    (a) silo
    (b) specialty warehouse
    (c) bulk warehouse
    (d) refrigerated warehouse
5. Major function of warehouse is ___________________.
    (a) storage
    (b) protection
    (c) value addition
    (d) All the above

D. Answer in Brief

1. Discuss in brief the classification of warehouses based on the nature of products they store.
2. What is the difference between public, private and leased warehouse?
3. How would you differentiate between market centered and production centered warehouse?
4. What are the characteristics of a good warehouse?
5. Discuss how silo is different from classical warehouse.
6. Special commodities like cut flowers are stored in which type of warehouse and why?

E. Check your Performance

1. Draw a chart showing various categories of warehouse.
2. Demonstrate the various functions of a warehouse.